COMMONWEALTH OF VIRGINIA
STATE AIR POLLUTION CONTROL BOARD MEETING
December 7, 2010

SUBJECT: Prevention of Significant Deterioration (PSD) Permit for Dominion - Warren County Power Station (WCPS), Registration No. 81391 - Public Participation Report and Request for Board Action

SPEAKER: Janardan R. Pandey, P.E.
Air Permit Manager, Valley Regional Office
Department of Environmental Quality

INTRODUCTION

Virginia Electric and Power Company (Dominion) has proposed to construct and operate a natural gas-fired combined-cycle electric power generating facility in Warren County with a nominal generating capacity of 1280 megawatts (MW) at ISO (International Organization for Standardization) conditions. Prevention of Significant Deterioration (PSD) permitting is triggered because, as a fossil fuel-fired steam electric plant of more than 250 million British thermal units (Btus) heat input capacity, the proposed facility is a major source under 9 VAC 5 Chapter 80. The proposed site is less than five miles from the northern border of Shenandoah National Park (SNP), a Class I area.

Dominion purchased the previously permitted CPV-Warren site which was never constructed. According to Dominion, a new PSD permit is necessary to meet current demand and due to technological advances in turbine equipment.

Dominion submitted its air permit application January 19, 2010. The application was deemed complete September 3, 2010, following DEQ's receipt of Dominion's Class I area air dispersion analyses results.

The applicant held an informational briefing on May 11, 2010. DEQ's public briefing for the proposed permit was held October 7, 2010, and the public hearing was held November 9, 2010. The public comment period ended November 24, 2010.

Staff analysis has shown that Dominion has met the requirements of the PSD permitting regulations at 9 VAC 5 Chapter 80, Part II, Article 8, and that the proposed facility, operating in accordance with the conditions of the proposed permit (Attachment 1), will not cause an exceedence of ambient air quality standards and consumption of allowable increment. The mitigation plan as proposed in the permit will adequately mitigate the adverse impacts on the aquatic systems of the SNP and result in a net environmental benefit to park resources.

PERMIT APPLICATION REVIEW

Dominion has applied for a permit to construct and operate a natural gas-fired combined-cycle electric power generating facility with a nominal generating capacity of 1280 megawatts (MW). The proposed facility is comprised of three combustion turbine (CT) generators, each having a heat recovery steam generator (HRSG) driving a common steam turbine (ST) for additional electricity generation. Each HRSG has a duct burner (DB) for supplemental firing. The CT-HRSG arrangement is commonly called combined cycle. The proposed facility also includes an auxiliary boiler, an emergency firewater pump, an emergency generator, a fuel gas heater, three turbine inlet chillers, and a distillate oil storage tank.

The primary pollutant of concern from the combined-cycle units is nitrogen oxides (NO_X). NO_X from the units would be controlled using dry low-NO_X combustion and selective catalytic reduction (SCR). Other pollutants from the proposed facility are particulate matter having an aerodynamic diameter equal to or less than ten microns (PM-10), particulate matter having an aerodynamic diameter equal to or less than 2.5 microns (PM-2.5), carbon monoxide (CO), volatile organic compounds (VOC), sulfur dioxide (SO_2), sulfuric acid mist, and toxic pollutants. An oxidation catalyst would control emissions of CO, VOC, and some toxic pollutants from the combined-cycle units. The total emissions from the proposed project are shown in Table 1.

Table 1. Total emissions from proposed Dominion - Warren project (tons/yr)

Pollutant	Emissions
NO_X	330.7
CO	374.8
SO_2	12.5
VOC	190.6
PM-10	163.6
PM-2.5	163.2
Sulfuric acid mist	9.5
Formaldehyde	6.34
Acrolein	0.176
Cadmium	0.00551
Chromium	0.00702
Nickel	0.0105

Note: Emissions of regulated toxic pollutants other than formaldehyde, acrolein, cadmium, chromium, and nickel are below permitting exemption thresholds and were therefore not included in Table 1.

The proposed site for Dominion - Warren is a 38.6-acre parcel in the Warren Industrial Park, approximately one mile north of Interstate Route 66. The site is located in a developed area of the parcel consisting of approximately 22.7 acres. The UTM coordinates of the proposed site are 744.61 kilometers (km) Easting and 4317.04 km Northing. The project will be located at a base elevation of 570 feet mean sea level. The nearest terrain to exceed stack height is at 746.95 km Easting and 4312.10 km Northing, approximately 5.46 km southeast of the proposed facility.

There are two Class I areas within 100 km of the proposed facility: SNP (7.1 km from proposed site) and the Dolly Sods Wilderness Area (100 km from proposed site).

Throughout the application review process, Dominion collaborated with DEQ and the Federal Land Managers (FLMs) to ensure that Class I air quality analyses would be conducted according to the guidelines established for such analyses by the FLMs.

Dominion submitted its air permit application January 19, 2010. Dominion also submitted a certification, dated January 25, 2010, from the Administrator of Warren County stating that the proposed location and operation of the facility is fully consistent with applicable local ordinances. The application was deemed complete September 3, 2010, when DEQ received Dominion's Class I area air dispersion analyses results. Copies of each of the referenced submittals were provided to EPA Region III, the National Park Service (NPS), and the U.S. Forest Service (USFS).

DEPARTMENT ANALYSIS

Criteria Pollutants

Applicability of PSD review is evaluated on a pollutant-specific basis. Regulated pollutants having net emissions increases in excess of significance levels prescribed in 9 VAC 5-80-1710 are subject to PSD review. Criteria pollutants exceeding PSD significance levels for the proposed Dominion project are NO_X, CO, VOC, PM-10, PM-2.5, and sulfuric acid mist.

Emissions of pollutants subject to PSD review are required to undergo a top-down Best Available Control Technology (BACT) analysis and air quality analyses, which are discussed below.

BACT

Pollutants subject to a PSD review from a proposed facility must undergo a rigorous "top-down" BACT analysis. The "top-down" method provides that all available control technologies be ranked in descending order of control effectiveness. The applicant first examines the most stringent or "top" alternative. The top alternative is established as BACT unless the applicant demonstrates that technical considerations or energy, environmental, or economic impacts justify that the most stringent technology is not feasible. For the proposed Dominion project, the pollutants subject to BACT are NO_X, CO, VOC, PM-10, PM-2.5, and sulfuric acid mist.

The BACT analysis has resulted in the following control methods and emission limits as conditions in the proposed permit.

Combustion Turbines

NO_X: Dry low-NO_X combustion
Selective Catalytic Reduction (SCR)
2.0 ppm (25.3 lb/hr) as a one-hour average

CO: Oxidation catalyst
1.5 ppmvd without duct burner firing
2.4 ppmvd with duct burner firing

VOC: Oxidation catalyst
0.7 ppmvd without duct burner firing
1.6 ppmvd with duct burner firing

PM-10: Natural gas only
Maximum gas sulfur content: 0.0003% by weight
8.0 lb/hr or 0.0027 lb/MMBtu without duct burner firing
14.0 lb/hr or 0.0040 lb/MMBtu with duct burner firing

PM-2.5: Natural gas only
Maximum gas sulfur content: 0.0003% by weight
8.0 lb/hr or 0.0027 lb/MMBtu without duct burner firing
14.0 lb/hr or 0.0040 lb/MMBtu with duct burner firing

Sulfuric acid mist: Natural gas only
Maximum gas sulfur content: 0.0003% by weight

Auxiliary Boiler and Fuel Gas Heater

Ultra-low NO_X burners

Use of natural gas only (maximum sulfur content: 0.0003% by weight)

Emergency Units (generator and firewater pump)

Use of ultra-low sulfur oil (maximum sulfur content 0.0015% by weight)

Annual operating hours of each unit limited to 500

Table 2 presents a summary of the estimated annual emissions from the proposed facility

showing the contribution from each emission unit type.

Table 2. Annual emissions of criteria pollutants from proposed facility (tons/yr)

Pollutant	Combined-Cycle Units	Auxiliary Boiler	Fuel Gas Heater	Inlet Chillers	Emergency Generator	Emergency Firewater Pump	Total
NO_X	317.70	4.24	2.51	-	5.77	0.49	330.7
CO	348.60	14.27	8.43	-	3.16	0.43	374.9
SO_2	12.27	0.11	6.37E-02	-	6.5E-03	8.8E-04	12.5
VOC	181.02	2.08	1.23	-	5.77	0.49	~~190.6~~
PM-10	159.12	1.93	1.70	0.48	0.36	4.90E-02	163.6
PM-2.5	159.12	1.93	1.70	1.45E-03	0.36	4.90E-02	163.2
H_2SO_4	9.54	8.3E-03	4.9E-03	-	-	-	9.5
Lead	0.022	1.89E-04	1.12E-04	-	3.80E-05	5.17E-06	0.02

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Toxic Pollutants (Hazardous Air Pollutants (HAPs))

The electric generating units proposed by Dominion are subject to the toxic pollutant standards in 9 VAC 5-60-300. As a result, Dominion conducted an evaluation of toxic pollutants in comparison to the emission standards in 9 VAC 5-60-300. This evaluation included a modeling analysis for five pollutants for which uncontrolled emissions were above the exemption levels in 9 VAC 5-60-300 (acrolein, formaldehyde, cadmium, chromium, and nickel). The modeling analysis indicates that the impacts of the five pollutants are well below their applicable Significant Ambient Air Concentrations (SAACs).

40 CFR 63 Subpart YYYY, National Emissions Standards for HAPs from Stationary Combustion Turbines, applies to CTs located at major HAP sources. The HAP emissions from the proposed Dominion - Warren facility do not exceed major source thresholds for HAPs (i.e., 10 tons per year of a single HAP or 25 tons per year of all HAPs combined). Accordingly, the proposed facility is not subject to the MACT standard. It should be noted that the MACT stipulates oxidation catalyst as one way to comply with the MACT limits (oxidation catalysts not only reduce CO and VOC emissions, they also reduce volatile HAP emissions such as formaldehyde, toluene, acetaldehyde, and benzene). Dominion has proposed oxidation catalyst to control CO and VOC emissions from its facility.

Testing

The permit requires initial compliance testing for NO_X, SO_2, CO, PM-10, PM-2.5, and VOC from the combined-cycle units. The need for periodic performance testing will be evaluated during processing of the Title V permit for the facility based on the results of the initial testing and operating data. A condition allowing DEQ to require additional testing has been included in the permit. A visible emissions evaluation (VEE), concurrent with the initial CT

stack test, is required by the permit. Periodic CT stack visible emission inspections, which trigger a VEE according to EPA Method 9 if visible emissions are observed, have been included in the permit. Also, a VEE, concurrent with the initial auxiliary boiler and fuel gas heater stack test, is required by the permit.

The permit allows the permittee to use the fuel quality characteristics in a current, valid purchase contract, tariff sheet, or transportation contract for the fuel to verify that the sulfur content of the natural gas is 0.1 grains or less of total sulfur per 100 standard cubic feet. Alternatively, per 40 CFR 60.4370, the permit allows Dominion to determine the sulfur content of the natural gas by testing using two custom monitoring schedules or an EPA-approved schedule. The permit also requires the permittee to obtain fuel supplier certification for each shipment of distillate oil used in the emergency units.

Monitoring

The permit requires that the CT stacks be equipped with Continuous Emission Monitoring Systems (CEMS) meeting the requirements of 40 CFR Part 75 (Acid Rain Program) for NO_X and SO_2 (unless an alternative method of determining SO_2 emissions has been approved for that purpose). In addition to the CEMS, the permit requires Dominion to conduct extensive, continuous monitoring of key operational parameters on the control devices to assure proper operation and performance.

Recordkeeping

The permit requires Dominion to keep records of all CEMS results and control device parametric monitoring results. Dominion is further required by the permit to keep records of all fuel certifications and testing results and of operating hours for all emission units.

Reporting

Dominion must provide quarterly reports to DEQ of CEMS results, including whether or not excess emissions have occurred. Dominion is also required by the permit to notify DEQ of commencement of construction, facility start-up, and to provide 30-day prior notice for each performance test conducted.

Air Quality Analyses

In addition to the BACT review, PSD regulations require an air quality analysis be performed that demonstrates the projected air emissions from the proposed facility will neither cause or significantly contribute to a violation of any applicable National Ambient Air Quality Standard (NAAQS) or PSD increment. In addition, PSD regulations require that an additional impact analysis consisting of a soil and vegetation analysis, a growth analysis, and a visibility impairment analysis be conducted. An analysis of the project's impact on air quality and air quality related values (AQRVs) in any affected Class I area is also required.

Prior to conducting the analyses, Dominion submitted protocols outlining the intended methodology and input data for both areas. DEQ staff reviewed and approved both the Class I and Class II protocols. The Class I protocol was also reviewed and approved by the FLMs.

Based on DEQ's review of the NAAQS and PSD increment analyses, the proposed project does not cause or significantly contribute to a predicted violation of any applicable NAAQS or Class I and Class II area PSD increment.

The DEQ's review of the required air quality analyses for the Warren County Power Station for both Class I and Class II PSD areas is attached to this document (Attachment 3). This document also includes DEQ's review of an additional impact analysis consisting of a soil and vegetation analysis, a growth analysis, and a visibility impairment analysis.

Mitigation Plan

The NPS concluded that the impact of the project's emissions constitute an adverse impact upon visibility in the SNP. The NPS is also concerned about the contribution of additional acidifying pollutants into the aquatic ecosystems and stated that the project, as proposed, would have an adverse impact on the aquatic systems in the SNP.

The NPS also acknowledged that all parties (NPS, DEQ and Dominion) have reached a mutually acceptable emissions reduction plan that will result in a net environmental benefit in the SNP. The NPS concluded that although plume impacts cannot be directly offset with emissions reductions in other locations, visibility impact concerns are alleviated when sufficient emission reductions are achieved to demonstrate a net environmental benefit to the SNP.

The draft permit includes a mitigation plan that will result in a net environmental benefit to the SNP (Condition 23 of the final draft permit - Attachment 1). The plan includes securing emissions reductions equal to the total annual NO_X limit (330.7 tons per year) from: a) the shutdown of the Dominion-North Branch Power Station in Grant County, WV; b) the previously obtained NO_X offsets from World Kitchen in Martinsburg, WV; and c) retiring eligible allowances (SO_2 or NO_X) from Dominion's existing facilities or obtaining emission reduction credits. The NPS has determined that for the proposed project these actions provide full mitigation or acceptable net environmental benefits for all potential or actual adverse impacts to AQRVs, including visibility and aquatic resources, at SNP.

PUBLIC PARTICIPATION ACTIVITIES

Applicant Informational Briefing

In accordance with 9 VAC 5-80-1775 C of the Regulations, the applicant held an informational briefing at 6:30 p.m. on May 11, 2010 at the North Warren Volunteer Fire & Rescue in Front Royal. As required, the briefing was advertised in the Northern Virginia Daily and the Warren Sentinel at least 30 days in advance (on March 19 and March 25, 2010, respectively).

Public Briefing

9 VAC 5-80-1775 J specifies that a briefing be scheduled prior to the public comment period, if appropriate. DEQ conducted a public briefing at 6:30 p.m. on October 7, 2010 at the Warren County Government Center in Front Royal. A legal advertisement for the briefing was placed in the Northern Virginia Daily on September 4, 2010.

Public Hearing

In accordance with 9 VAC 5-80-1775 F, a public hearing announcement was published in the Northern Virginia Daily newspaper on October 9, 2010. The public hearing was held on November 9, 2010. Thirty-nine persons attended the hearing. Fourteen of the attendees offered testimony and four sets of written comments and one map were received and entered into the record by the Department. Of the fourteen oral comments provided at the hearing, nine were in support of the proposed facility.

Public Comment Period

The comment period for the draft permit ran from October 10, 2010 through November 24, 2010. During the public comment period, 120 written and 10 oral comments were received. The written comments included letters from the U.S. Department of the Interior, Shenandoah National Park Trust, County of Warren, County of Clarke, Dominion, five from environmental advocacy groups, one local business, and 103 from citizens, of which 70 were similar electronic mail form letters from throughout Virginia and a few from neighboring states. Ninety-eight (98) commenters requested that the State Air Pollution Control Board make the final permit determination rather than DEQ.

Copies of all letters received during the public comment period are appended (Attachment 4), as is a copy of DEQ's summary of and response to the comments (Attachment 5). Dominion also provided responses to the comments on December 3, 2010 (Attachment 6).

Changes to the Draft Permit

The following changes were made to the draft permit in response to comments received. Details of these changes are described in Attachment 7.

- Short-term and annual PM-10 and PM-2.5 emission limits have been reduced.
- Annual VOC emission limits have been reduced.
- The mitigation plan (Source Reductions and Emission Offsets) condition has been revised.
- Operational restriction requirements for the duct burners are included to comply

with the PM-2.5 increment.

SUPPORTING DOCUMENTATION

Immediately following this agenda memo are the following documents:

1. Draft Final Permit (with track changes)
2. Draft Final Permit (clean copy)
3. Addendum to the Permit Engineering Evaluation dated September 30, 2010 (also includes the updated Air Quality Analyses Review)
4. Public Participation Report (including full text of all written comments received and recording of the public hearing)
5. Summary of and Response to Public Comments
6. Dominion's Response to Public Comments
7. Summary of Changes to Draft Permit

The permit application, original draft permit, and the original permit engineering evaluation are available on the DEQ web site at http://www.deq.virginia.gov/air/permitting/Dominion_Warren.html and are not included.

RECOMMENDATION

The Board approve the proposed permit with the changes discussed above.

ATTACHMENT 1

Draft Final Permit (with track changes)

ATTACHMENT 2

Draft Final Permit (clean copy)

ATTACHMENT 3

Addendum to the Permit Engineering Evaluation dated September 30, 2010 (also includes the updated Air Quality Analyses Review)

ATTACHMENT 4

Public Participation Report (including full text of all written comments received and recording of the public hearing)

ATTACHMENT 5

Summary of and Response to Public Comments

ATTACHMENT 6

Dominion's Response to Public Comments

ATTACHMENT 7

Summary of Changes to Draft Permit in Response to Comments